US008919591B2

(12) **United States Patent**
Cai et al.

(10) **Patent No.: US 8,919,591 B2**
(45) **Date of Patent: Dec. 30, 2014**

(54) **INSULATING LID FOR A FOOD CONTAINER AND METHOD OF MAKING THE SAME**

(75) Inventors: **Liming Cai**, West Chester, PA (US); **Chris T. Bruch**, Downingtown, PA (US); **Ayberk Abayhan**, Lake Bluff, IL (US)

(73) Assignee: **Pactiv LLC**, Lake Forest, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 322 days.

(21) Appl. No.: **13/438,051**

(22) Filed: **Apr. 3, 2012**

(65) **Prior Publication Data**

US 2012/0255959 A1 Oct. 11, 2012

Related U.S. Application Data

(60) Provisional application No. 61/472,351, filed on Apr. 6, 2011.

(51) **Int. Cl.**

B65D 43/03	(2006.01)
B65D 43/04	(2006.01)
B65D 43/06	(2006.01)
B65D 81/38	(2006.01)
A47J 41/00	(2006.01)
B65D 51/24	(2006.01)
B65D 43/02	(2006.01)

(52) **U.S. Cl.**

CPC ***B65D 51/245*** (2013.01); ***B65D 43/0208*** (2013.01); *B65D 2543/00092* (2013.01); *B65D 2543/00231* (2013.01); *B65D 2543/00296* (2013.01); *B65D 2543/00407* (2013.01); *B65D 2543/00509* (2013.01); *B65D 2543/00537* (2013.01); *B65D 2543/00555* (2013.01); *B65D 2543/00731* (2013.01); *B65D 2543/00796* (2013.01)

USPC **220/215**; 220/367.1; 220/592.2; 220/523; 206/545; 206/508; 229/403

(58) **Field of Classification Search**

USPC 220/215, 367.1–374, 368, 792, 521, 220/592.17, 592.2, 254.7, 790, 378, 523; 206/545, 508; 229/403; 40/311

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,283,448	A *	5/1942	Malek	220/215
3,193,130	A *	7/1965	Miller	220/374
3,360,161	A *	12/1967	Smith	220/719
3,459,324	A	8/1969	Miller	
4,213,537	A	7/1980	Caccavale	
4,795,052	A	1/1989	Hayes, Jr.	
4,915,250	A	4/1990	Hayes, Jr.	
5,310,981	A *	5/1994	Sarnoff et al.	219/731
5,540,350	A	7/1996	Lansky	
D413,631	S	9/1999	Hendler et al.	
5,971,195	A	10/1999	Reidinger et al.	
5,979,689	A	11/1999	Lansky	
6,199,711	B1	3/2001	Lansky	

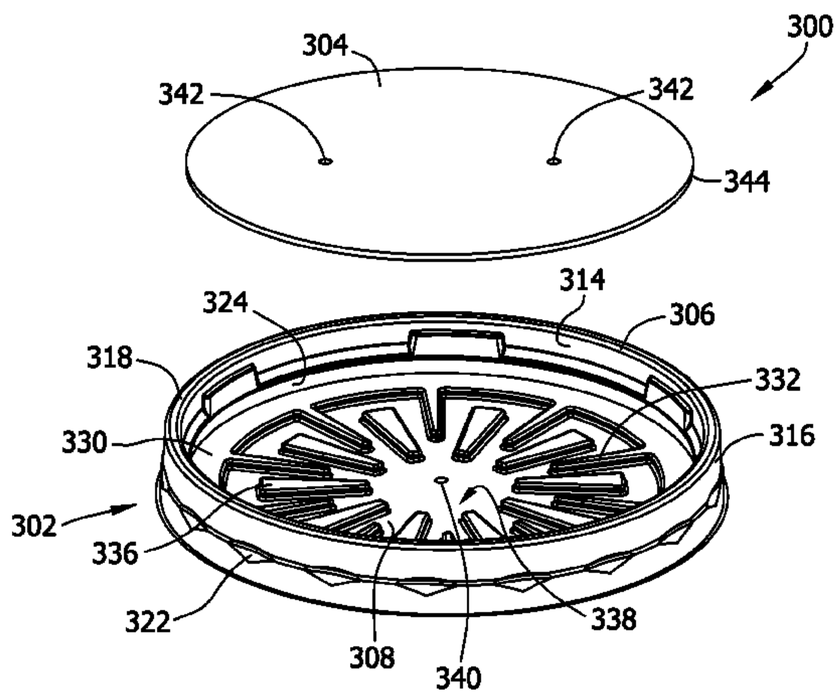
(Continued)

Primary Examiner — Fenn Mathew
Assistant Examiner — Jennifer Castriotta
(74) *Attorney, Agent, or Firm* — Armstrong Teasdale LLP

(57) **ABSTRACT**

An insulating lid includes a cover having an outer edge and a base. The base includes an upper surface, a lip projecting upwardly from the upper surface about an outer perimeter of the base to define an inner area, and a plurality of spacer members extending upwardly from the upper surface positioned within the inner area. The plurality of spacer members are configured to space the cover a distance from the upper surface of the base to define an insulating space between the cover and the upper surface of the base.

17 Claims, 7 Drawing Sheets



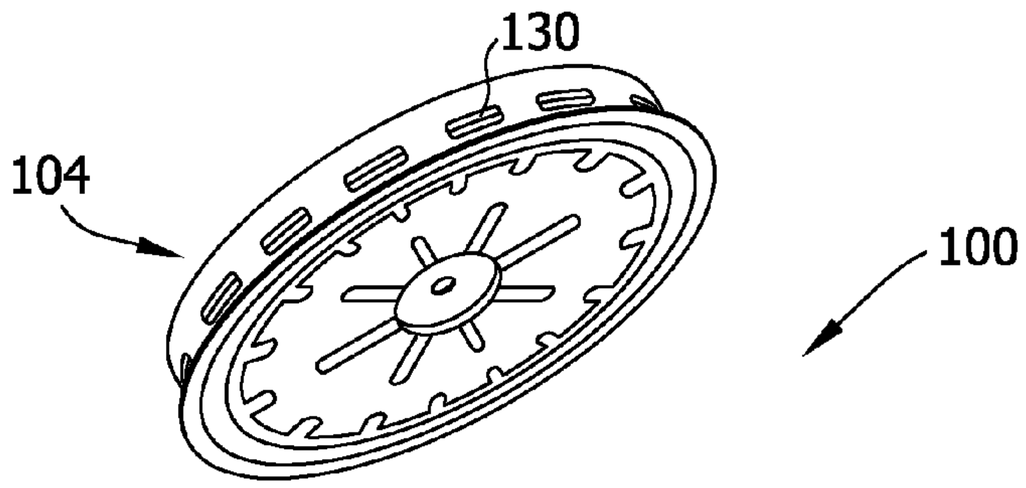
(56) **References Cited**

U.S. PATENT DOCUMENTS

6,311,860	B1	11/2001	Reidinger et al.
6,419,112	B1	7/2002	Bruce et al.
6,578,726	B1	6/2003	Schaefer
D500,343	S	12/2004	McRobbie
7,055,715	B2	6/2006	Maravich et al.
7,100,787	B2	9/2006	Farnsworth et al.
7,195,130	B2	3/2007	Pendergrass et al.
7,318,536	B2	1/2008	Maravich et al.
7,484,639	B2	2/2009	Maravich et al.
7,959,029	B2	6/2011	Whitaker et al.
8,074,831	B2	12/2011	Walker et al.
2002/0074337	A1	6/2002	Melton
2005/0035011	A1	2/2005	McRobbie
2005/0035018	A1	2/2005	McRobbie
2007/0075080	A1	4/2007	Farnsworth et al.
2008/0041867	A1	2/2008	Jochem et al.

* cited by examiner

FIG. 1



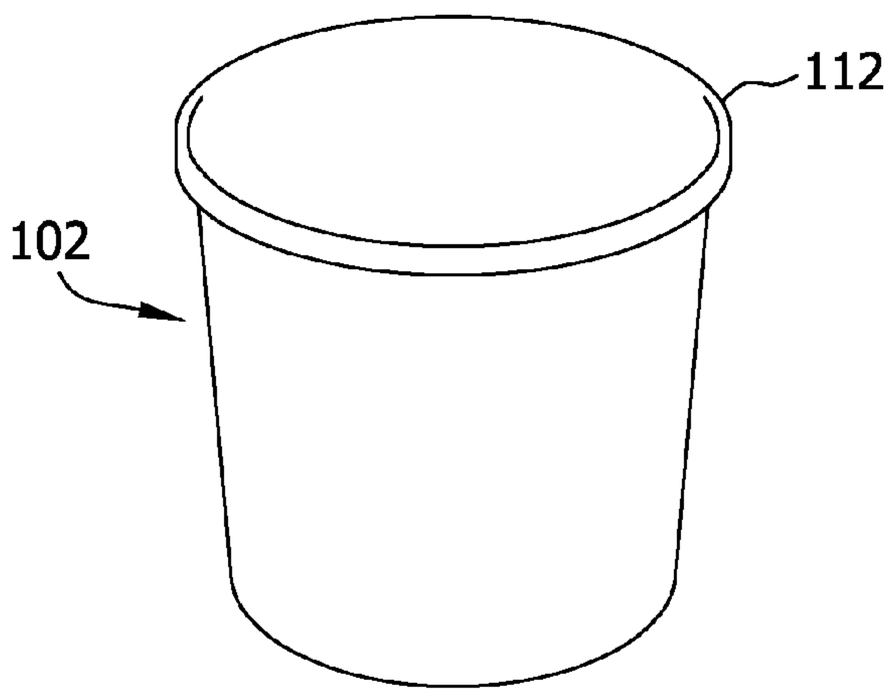


FIG. 2

FIG. 3

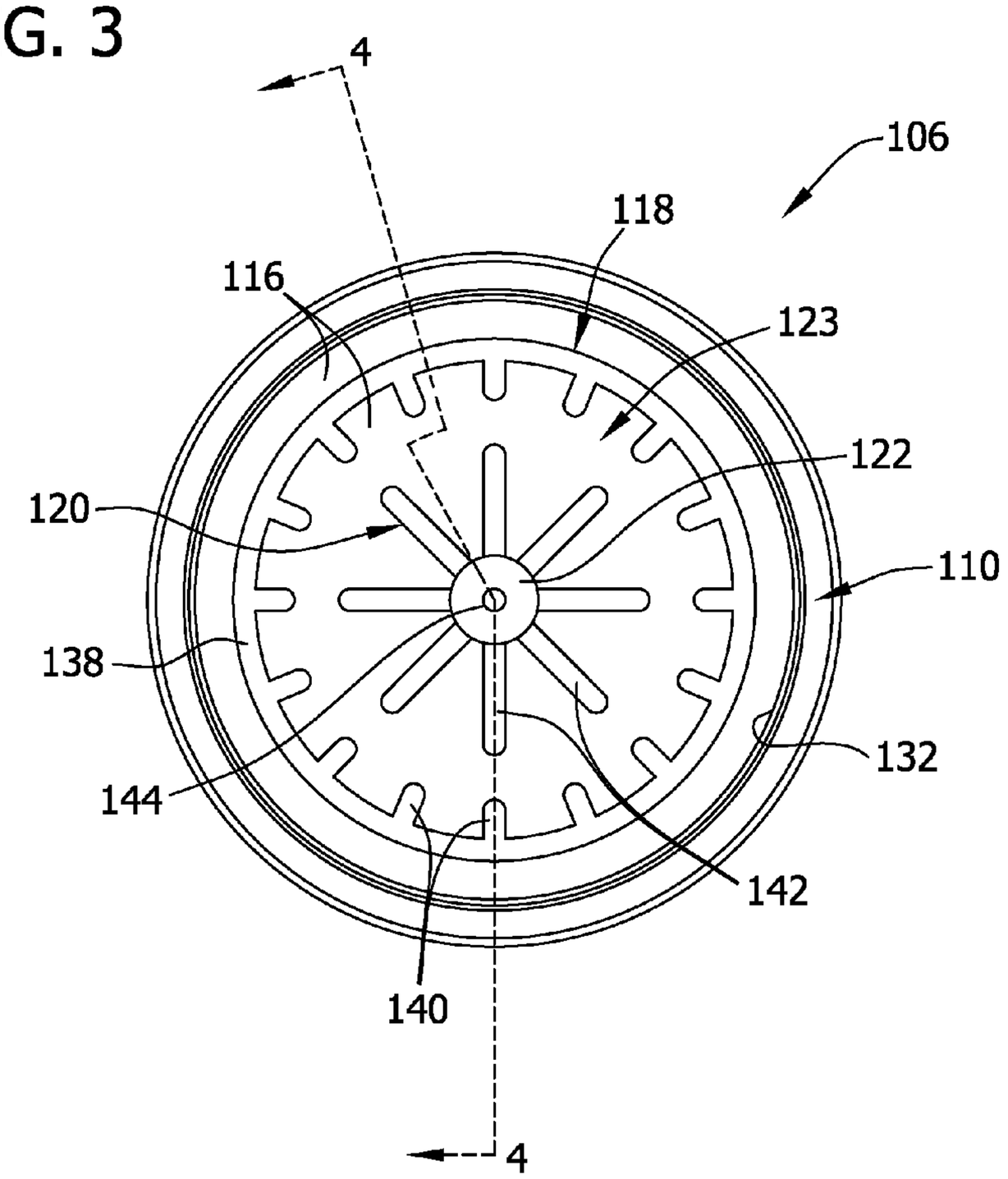

4
106
118
116
123
122
120
110
138
132
144
142
140
4

FIG. 4

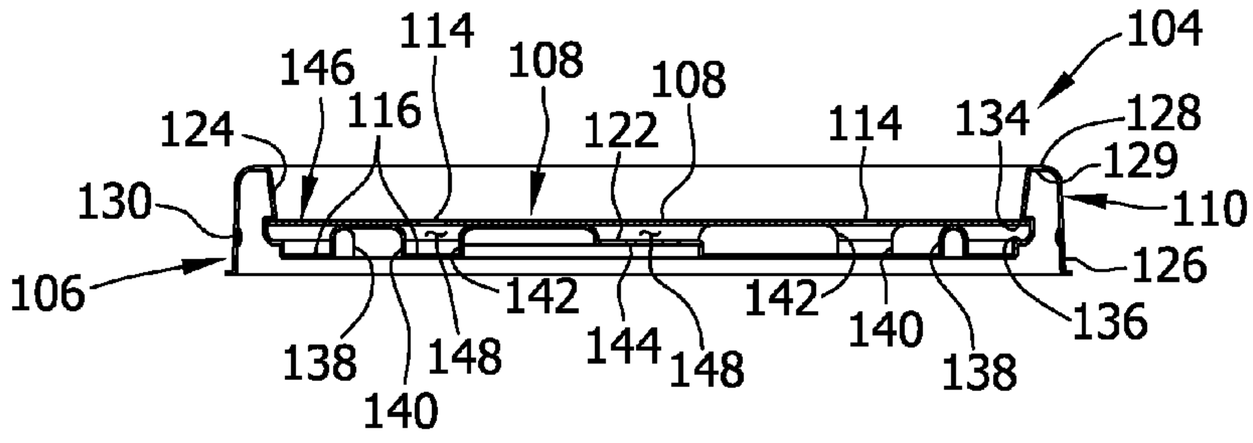

104
146
114
108
108
116
124
122
114
134
128
129
130
110
126
106
142
142
140
136
138
148
144
148
138
140

FIG. 5

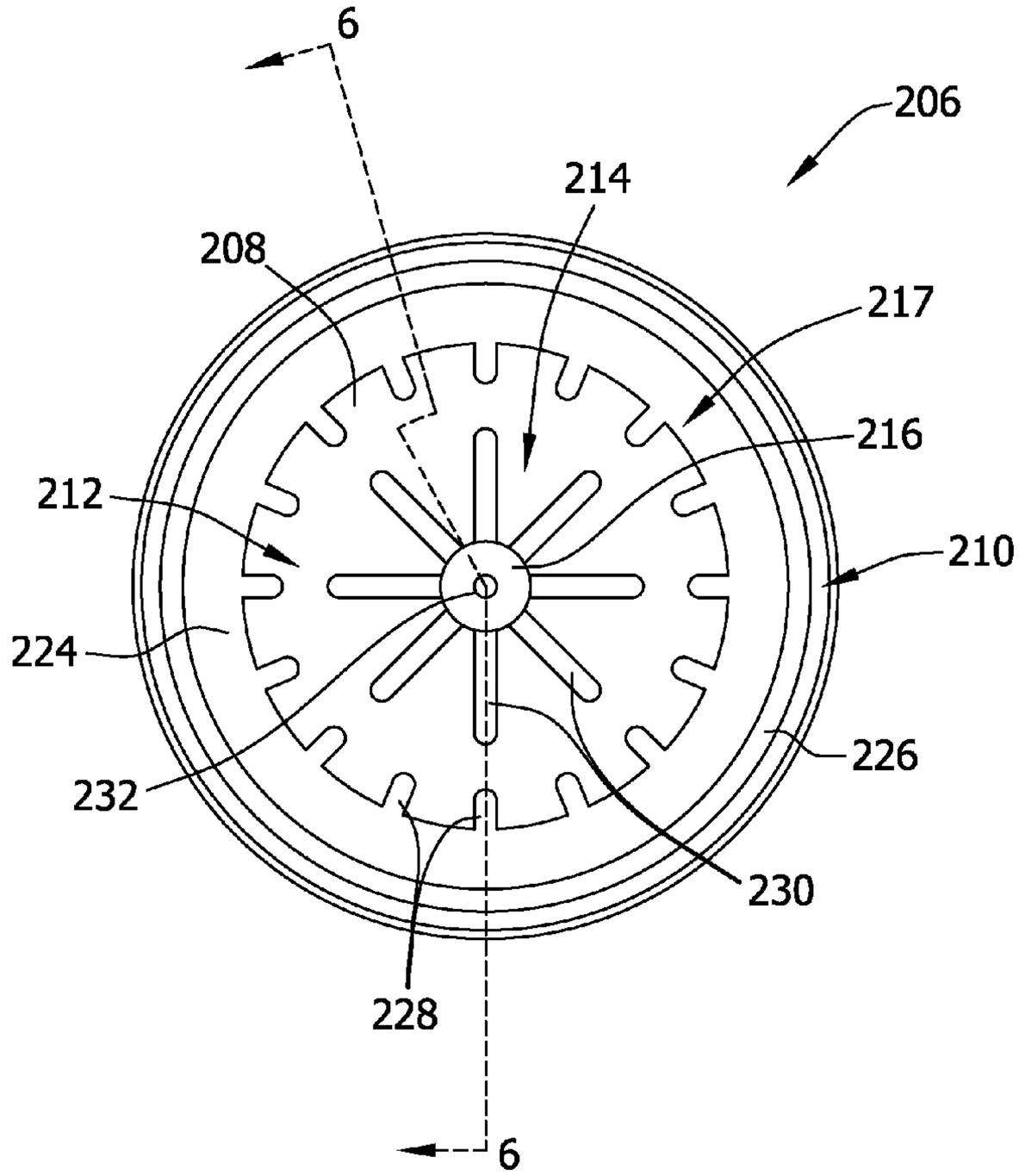

6
206
214
208
217
216
212
210
224
226
232
230
228
6

FIG. 6

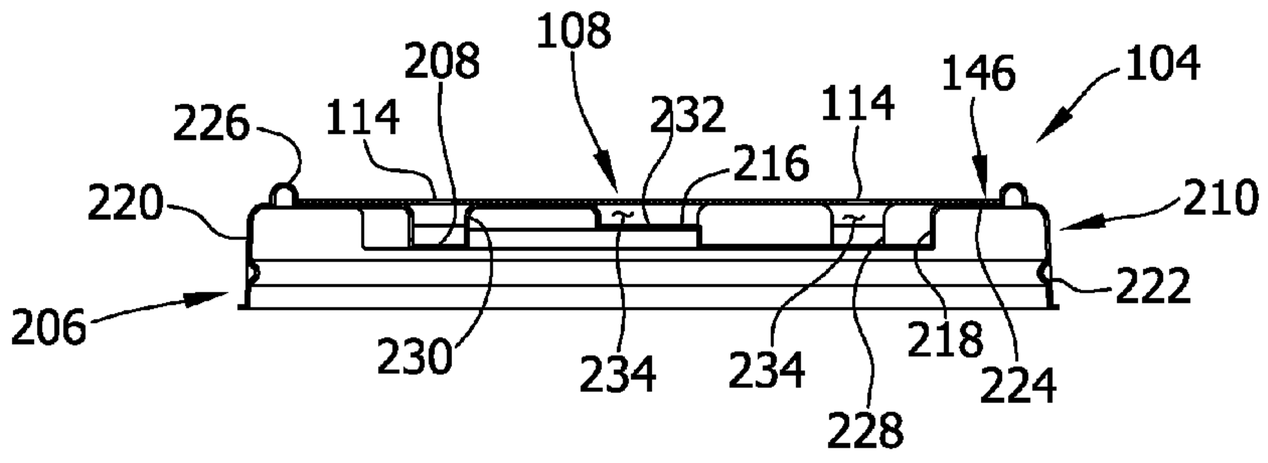

108
208
146
104
226
114
232
114
216
220
210
222
206
230
234
234
218
224
228

FIG. 7

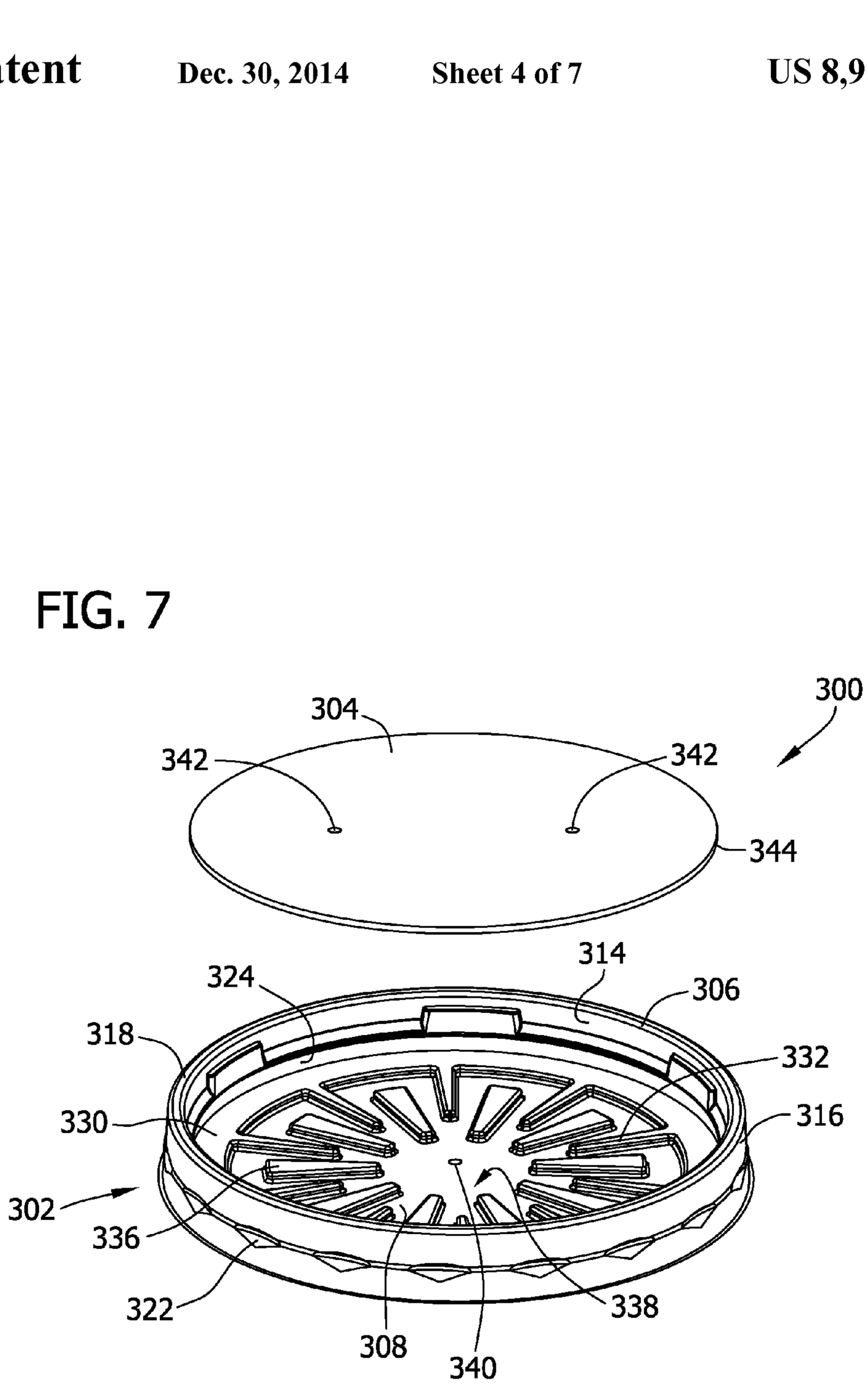

300
304
342
342
344
314
324
306
318
332
330
316
302
336
322
338
308
340

FIG. 8

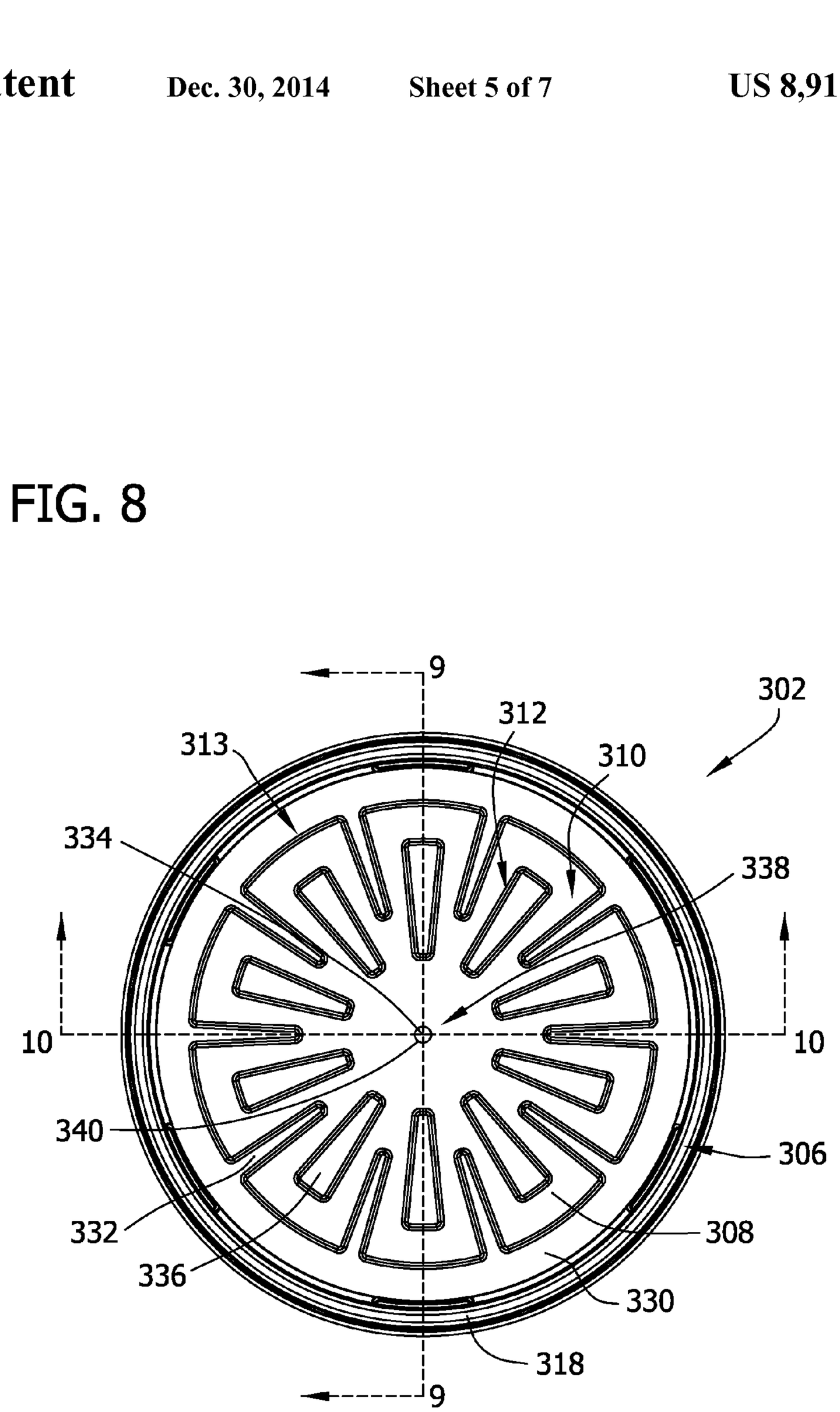


FIG. 9

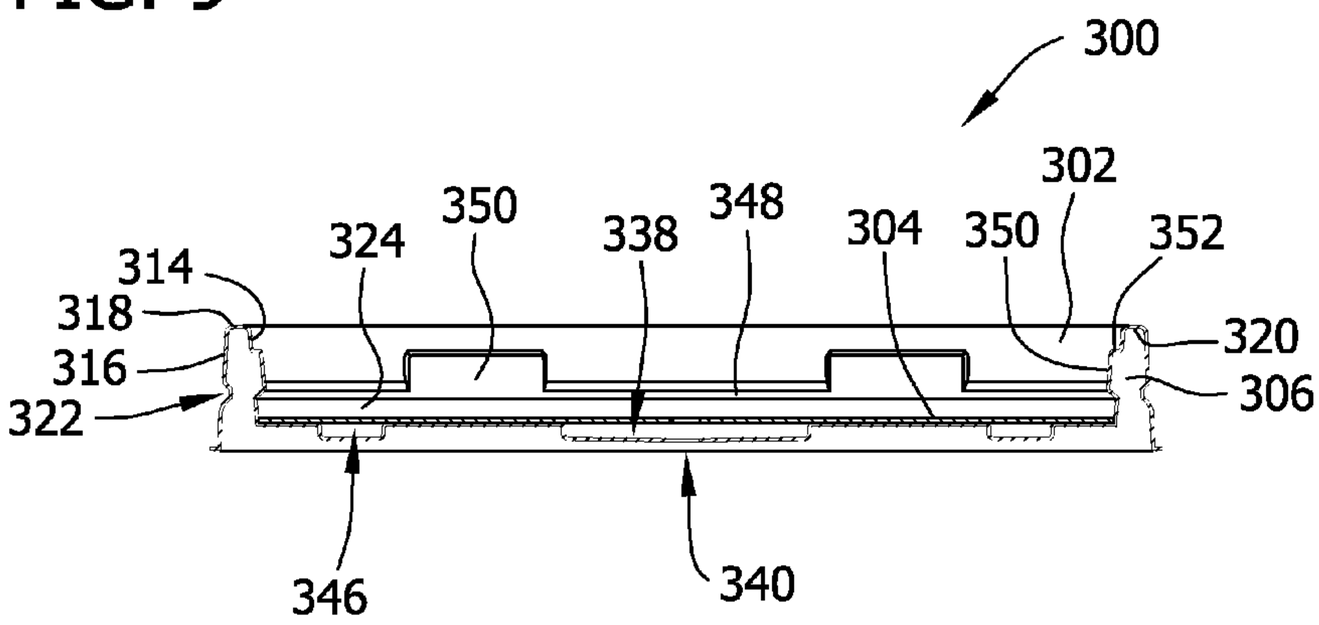


FIG. 10

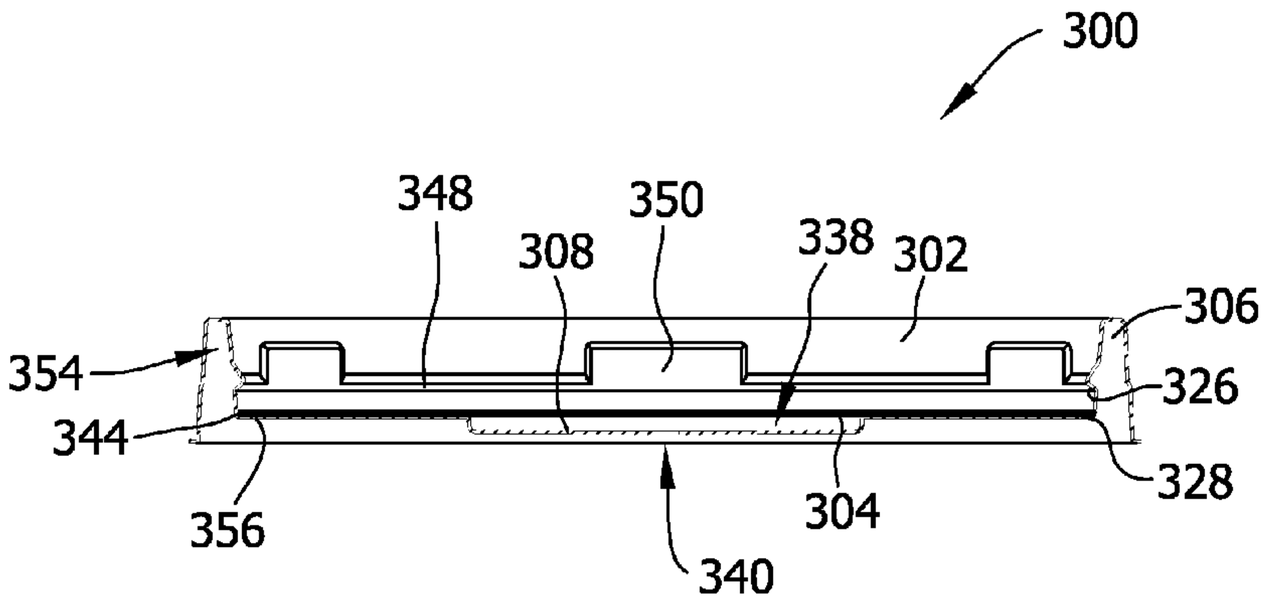


FIG. 11

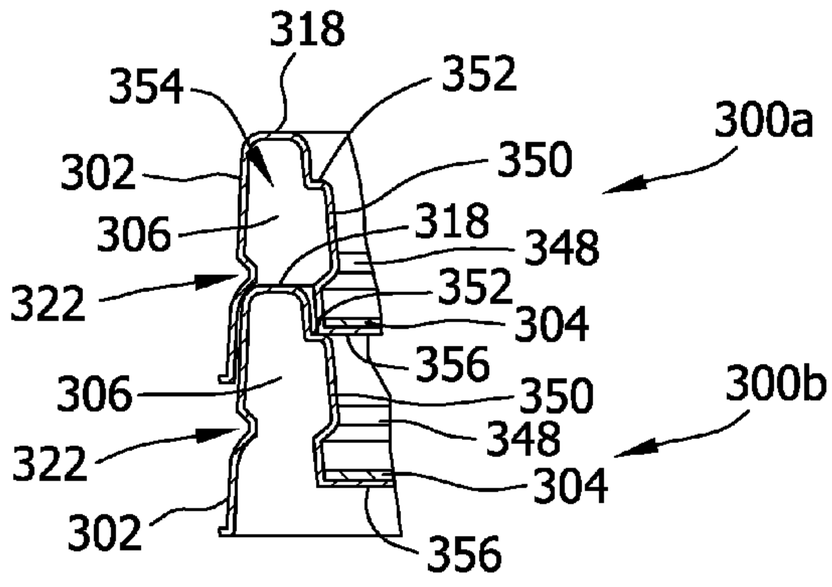
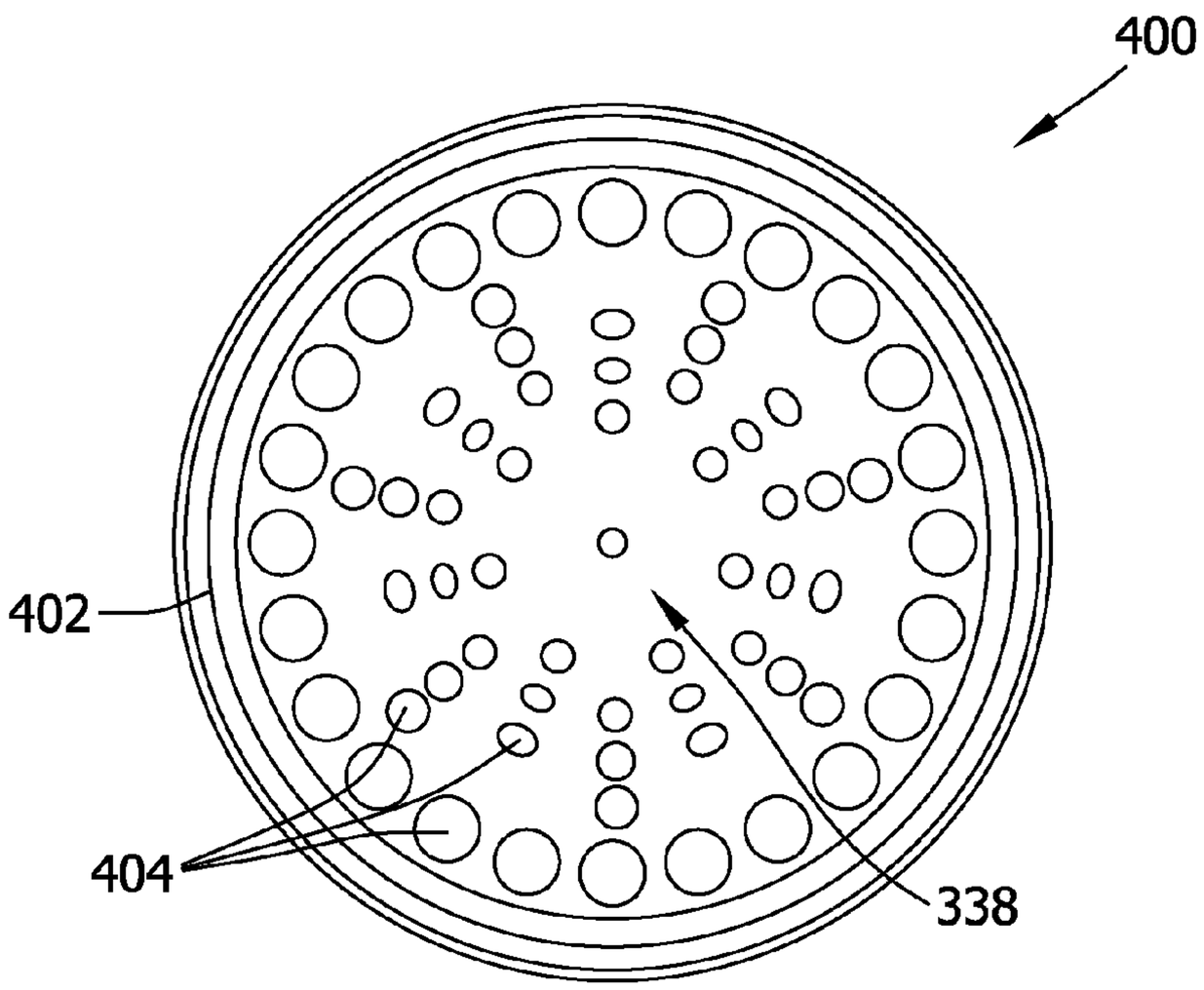


FIG. 12



INSULATING LID FOR A FOOD CONTAINER AND METHOD OF MAKING THE SAME

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the priority of U.S. Provisional Patent Application Ser. No. 61/472,351, filed Apr. 6, 2011, which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

The subject matter described herein relates generally to an insulating lid and, more particularly, to an insulating lid for a food container and a method of making the same.

Many known containers are configured to house products that should be maintained at a temperature either below or above ambient temperature (e.g., food or beverage products), and these known containers tend to be at least partially insulated. Some of these containers are configured to insulate a product for an extended period of time (e.g., days or weeks) such that they are intended for repeated use applications (e.g., a cooler or thermos that can be used, cleaned, and stored for future use). Other known containers are used to insulate a product for a shorter period of time (e.g., a few minutes or hours) such that they are intended for disposable use applications (e.g., point-of-sale applications in which a disposable coffee cup is sold to a consumer with coffee therein or a disposable soup bowl is sold to a consumer with soup therein).

Because the containers that are typically used to insulate for extended periods of time often have a foam-filled or vacuum-sealed chamber between two adjacent sidewalls of rigid plastic or metal, these containers are generally fabricated using materials and/or processes that are more expensive such that these containers are not practical for use in disposable applications. On the other hand, the containers that are typically used for disposable applications are often fabricated from materials and using processes that are less expensive (e.g., via a thin wall of flexible plastic that may be lined on the exterior with a thin sheet of bubble-wrap or foam).

The lids of many known disposable containers tend to be rather ineffective at insulating the container, but are typically inexpensive to make. In contrast, the lids of many known reusable containers tend to be more effective at insulating the container, but can be very expensive to make. Accordingly, what is needed is an insulating lid for use with a food container that is both inexpensive to make, and sufficiently insulating such that it provides improved insulating properties that can be used in either a disposable application or a reusable application.

BRIEF DESCRIPTION OF THE INVENTION

In one aspect, an insulating lid for a container is provided. The insulating lid includes a cover having an outer edge and a base. The base includes an upper surface, a lip projecting upwardly from the upper surface about an outer perimeter of the base to define an inner area, and a plurality of spacer members extending upwardly from the upper surface positioned within the inner area. The plurality of spacer members are configured to space the cover a distance from the upper surface of the base to define an insulating space between the cover and the upper surface of the base.

In another aspect, a base for use with an insulating lid for use with a container is provided. The base includes an upper surface, a lip projecting upwardly from the upper surface about an outer perimeter of the base to define an inner area, and a plurality of spacer members extending upwardly from the upper surface positioned within the inner area. The plurality of spacer members are configured to space a cover a distance from the upper surface of the base to define an insulating space between the cover and the upper surface of the base.

In yet another aspect, a method for assembling an insulating lid for a container. The lid includes a cover and a base. The base includes an upper surface, a lip projecting upwardly from the upper surface and extending around an outer perimeter of the base to define an inner area, and a plurality of spacer members extending upwardly from the upper surface positioned within the inner area. The method includes positioning the cover over the plurality of spacer members of the base to define an insulating space between the cover and the upper surface of the base, and coupling the cover to the base to form the lid.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded perspective view of an exemplary embodiment container system having a container and a lid.

FIG. **2** is a top view of an exemplary embodiment of a lid that may be used with the container system shown in FIG. **1**.

FIG. **3** is a top view of a base portion of the lid shown in FIG. **2** with a cover portion removed from the lid.

FIG. **4** is a cross-sectional view of the lid shown in FIG. **2** taken along line **4**-**4** of FIG. **3**.

FIG. **5** is a top view of a first alternative embodiment of a base portion of a first alternative embodiment of the lid shown in FIG. **6** with a cover portion removed from the lid.

FIG. **6** is a cross-sectional view of the first alternative embodiment of the lid shown in FIG. **5** and taken along line **6**-**6** of FIG. **5**.

FIG. **7** is an exploded perspective view of a second alternative embodiment of a lid that may be used with the container shown in FIG. **1**.

FIG. **8** is a top view of the lid shown in FIG. **7** with a cover removed.

FIG. **9** is a cross-sectional view of the lid shown in FIGS. **7** and **8** taken at line **9**-**9** of FIG. **8** with the cover included.

FIG. **10** is a cross-sectional view of the lid shown in FIGS. **7** and **8** taken at line **10**-**10** of FIG. **8** with the cover included.

FIG. **11** is a partial cross-sectional view of two of the lids shown in FIGS. **7**-**10** stacked.

FIG. **12** is a top view of a third alternative embodiment of a lid that may be used with the container shown in FIG. **1**.

DETAILED DESCRIPTION OF THE INVENTION

The exemplary embodiments described herein provide an insulating lid with improved insulating properties that can be inexpensively manufactured for either a disposable food container or a reusable food container. A method of making the improved insulating lid is also described herein. The lid described herein is configured to create an air gap or air pocket between a lower layer and an upper layer of the lid. Heated or cooled air from within the food container is channeled into the air pocket. This air gap helps to provide the lid with its improved insulating properties. In addition, the lid can be manufactured from a combination of plastic and paperboard materials making it relatively inexpensive to make. Thus, the embodiments of the lid described herein provide improved insulating properties such that the lids can be used with a reusable food container, and since these lids are inex-

pensive to make, they can also be used with disposable food containers. For the purposes of this patent application, the example embodiment of the lid will be described in the context of being used with a disposable container. However, as explained above, the lid could also be used with reusable containers.

The example embodiment of the lid includes a base portion and a cover portion. The base portion is typically manufactured from a plastic material, and is formed unitarily as one-piece. The base portion includes an upwardly projecting annular lip extending around an outer perimeter of the base portion and a plurality of upwardly projecting spacer members extending within an inner area of the base portion. The spacer member can include ribs, support ribs, dimples, and/or any other suitable member that facilitates forming an air pocket, as described in more detail herein. The annular lip has a top side and a bottom side. The bottom side of the annular lip is configured to receive an upper rim of a container for removably coupling or attaching the lid to the container. In one embodiment, the annular lip includes a retaining groove on the top side for at least partially securing the cover. In another embodiment, the annular lip includes a retainer rib projecting upwardly from the top side for receiving an outer peripheral portion of the cover. In both embodiments, the cover is sized to cover substantially all of an upper surface of the base.

In one embodiment, a set of first ribs, which may or may not support a cover thereon, extend radially inwardly from the annular lip toward a center of the base. In another embodiment, the set of first ribs, which may or may not support a cover thereon, extend radially inwardly from an annular support rib that is spaced radially inwardly from the annular lip. In both embodiments, a set of second ribs, which may or may not support a cover thereon, extend radially outwardly from a central hub of the base. The ribs are configured to maintain the cover in a spaced relationship relative to the upper surface of the base, thereby defining an air pocket between the cover and the base.

A vent, such as a hole or a flap, is defined within the central hub of the base to facilitate releasing steam from the container into the air pocket when the lid is coupled to the container, and a pair of diametrically opposed vents are also formed in the cover to provide an outlet for steam that enters the air pocket through the vent of the base. The cover is configured to be above the container's flush fill and to be glued, plugged, and/or otherwise mechanically fastened to the annular lip. The base is configured such that the cover vent register may not be used during assembly of the lid. In one embodiment, the thickness of the cover may be sized to enable support ribs of the base to contact the cover, thereby maintaining the cover in spaced apart relationship with respect to the base. In another embodiment, the spacer members may be spaced apart from the cover to facilitate supporting the cover in the event that a portion of the cover is displaced downward toward the base.

In another embodiment, the lid includes any combination and/or pattern of spacer members extending upwardly from the base to facilitate maintaining the cover in a spaced relationship relative to the upper surface of the base, thereby defining an air pocket between the cover and the base. The air pocket helps to provide at least some of the improved insulating properties of the lid. In addition, the base vent hole and the cover vents facilitate reducing an increased pressure that may build up within the container when the container includes a hot food product, and allow for compressed air to escape the container when the lid is secured to the container.

FIG. **1** is an exploded perspective view of an exemplary container system **100**. Container system **100** includes a container **102** and a lid **104**. Container **102** has an upper rim **112** and is configured to contain a product (e.g., a food product or a beverage) at a temperature above or below ambient temperature, and container **102** may be suitably insulated to facilitate maintaining a temperature of the product within container system **100** for a desired period of time. Lid **104** is configured to be detachably coupled to container **102** in a manner that substantially seals the product within container system **100**. Lid **104** helps to prevent the product from spilling out of container system **100** when lid **104** is coupled to container **102**, and limits air (e.g., steam) from within container system **100** from flowing outside of container system **100** causing a temperature change of the product contained within container **102**. In another embodiment, container **102** may have any suitable size and/or shape configured for containing any suitable product, and lid **104** may be detachably coupled to container **102** in any suitable manner that facilitates enabling lid **104** to function as described herein.

FIG. **2** is a top view of lid **104** detached from container **102**. Lid **104** has a base **106** and a cover **108** coupled to base **106**. Base **106** includes an annular lip **110** configured to receive upper rim **112** of container **102** for detachably coupling lid **104** to container **102** to substantially seal container system **100**. Cover **108** is coupled to base **106** such that lip **110** circumscribes cover **108**, and cover **108** includes a pair of diametrically opposed vent holes **114** to facilitate ventilating container system **100**, as described in more detail below. Alternatively, cover **108** may have any suitable number of vent holes **114** arranged in any suitable manner. In the exemplary embodiment, lid **104** is generally circular in shape, but lid **104** may be any suitable shape in other embodiments. In the exemplary embodiment, base **106** is integrally formed from a synthetic or semi-synthetic, organic-based material (e.g., a "plastic" material) using a molding process, and cover **108** is fabricated from a paper material. It is understood, however, that base **106** and/or cover **108** may be fabricated from any suitable materials using any suitable manufacturing processes.

FIG. **3** is a top view of base **106** with cover **108** removed, and FIG. **4** is a cross-sectional view of lid **104** taken along line **4-4** with cover **108** present. In the exemplary embodiment, base **106** is generally circular and includes an upper surface **116**, lip **110** projecting upwardly from upper surface **116**, an outer array **118** of spacer members projecting from upper surface **116**, an inner array **120** of spacer members projecting from upper surface **116**, and a central hub **122** projecting from upper surface **116**. The spacer members include ribs and/or support ribs. Lip **110** projects upwardly from upper surface **116** about an outer perimeter of base **106** to define an inner area **123**. Lip **110** has an inner surface **124**, an outer surface **126**, an upper side **128**, and a bottom side **129**. Bottom side **129** is configured to receive upper rim **112** of container **102**. In the exemplary embodiment, a plurality of circumferentially spaced indentations **130** (FIGS. **1** and **4**) are formed in outer surface **126**, and a retaining groove **132** is formed in inner surface **124**. Retaining groove **132** is spaced apart from upper surface **116** and includes a top surface **134** and a bottom surface **136**. In other embodiments, retaining groove **132** may have any suitable shape and location relative to upper surface **116**.

In the exemplary embodiment, outer array **118** includes an annular rib **138** and a plurality of radial ribs **140** that extend radially inwardly from annular rib **138**. Annular rib **138** is spaced radially inwardly from lip **110**, and radial ribs **140** are circumferentially spaced apart from one another about annular rib **138**. In one embodiment, outer array **118** includes

sixteen radial ribs **140**. In other embodiments, outer array **118** may have any suitable number of radial ribs **140**.

In the exemplary embodiment, inner array **120** includes a plurality of radial ribs **142** that are circumferentially spaced apart from one another about central hub **122**. Rib **138**, ribs **140**, and/or ribs **142** may or may not be support ribs. Each radial rib **142** of inner array **120** is substantially co-radially aligned with one radial rib **140** of outer array **118** such that every other radial rib **140** has a corresponding radial rib **142**. In the exemplary embodiment, each radial rib **142** is longer than, and spaced apart from, its corresponding radial rib **140**. In other embodiments, inner array **120** may include any suitable number of ribs **142** aligned in any suitable manner and having any suitable length relative to ribs **140**. In the exemplary embodiment, radial ribs **142** extend from and are at least partially integrally formed with central hub **122**. Ribs **142** of inner array **120** and ribs **138**, **140** of outer array **118** project to substantially the same height above upper surface **116** and below top surface **134** of retaining groove **132**. While inner array **120** includes eight radial ribs **142** in the exemplary embodiment, inner array **120** may have any suitable number of radial ribs **142** in other embodiments. In alternative embodiments, base **106** may include any number of ribs **138**, **140**, **142** having any suitable contours and/or orientations (e.g., ribs **140**, **142** may be curvilinearly oriented and may not be radially oriented).

In the exemplary embodiment, central hub **122** has a vent, such as vent hole **144**, formed in the central region thereof, and vent hole **144** extends through base **106** to facilitate ventilating (e.g., releasing steam from) container system **100** when lid **104** is coupled to container **102**. In other embodiments, central hub **122** may include any suitable number of vent holes **144** and/or vent flaps arranged in any suitable manner. Alternatively, vent hole(s) **144** may be located on any suitable segment of base **106** (e.g., vent holes **144** may not be formed in central hub **122**). In the exemplary embodiment, central hub **122** does not project to the height of radial ribs **142** such that central hub **122** is recessed relative to radial ribs **142**.

In the assembled configuration of lid **104**, cover **108** is fastened to base **106** above ribs **138**, **140**, **142** with a peripheral portion **146** of cover **108** received within retaining groove **132** of lip **110**. In some embodiments, cover **108** may be fastened to top surface **134** or bottom surface **136** of retaining groove **132** (e.g., via an adhesive or any other suitable fastener). In other embodiments, cover **108** may not be fastened to retaining groove **132** (e.g., cover **108** may be detachable from base **106** by simply removing peripheral portion **146** of cover **108** from retaining groove **132**). When peripheral portion **146** of cover **108** is inserted into retaining groove **132**, remaining segments of cover **108** (e.g., central segments of cover **108**) are seated above and/or on ribs **138**, **140**, **142** such that cover **108** is maintained and/or supported in a spaced apart relationship relative to upper surface **116**, thereby defining an air pocket **148** between cover **108** and upper surface **116** within annular rib **138** to facilitate insulating container system **100** and maintaining a temperature of the product within container system **100**. When ribs **138**, **140**, and/or **142** are support ribs, ribs **138**, **140**, and/or **142** apply an upward force on cover **108** while top surface **134** applies a downward force for securing cover **108** to base **106**.

Because air is permitted to flow through the spaces between radial ribs **142** of inner array **120** and into the area above central hub **122**, air can flow between air pocket **148** and sealed container system **100** (e.g., steam can be released from container system **100** into air pocket **148** through vent hole **144** of base **106**, thereafter exiting air pocket **148** through vent holes **114** of cover **108**). Since base **106** may be fabricated from a thin layer of plastic and cover **108** may be fabricated from a thin layer of paper material, and since air is used to facilitate insulating lid **104**, lid **104** may be fabricated in a less expensive manner, thereby rendering lid **104** more suitable for disposable (e.g., point-of-sale or one-time-use) applications. Alternatively, lid **104** may be fabricated from materials and using processes that render lid **104** more suitable for repeated use applications in other embodiments. Also, because cover **108** may be fabricated from a paper material, cover **108** may include marketing indicia (e.g., logos and/or slogans) printed on cover **108** to suit a particular vendor. Cover **108** is also configured for easy fastening to base **106**, thereby enabling a single configuration of base **106** to be used with various, customized covers **108** to decrease manufacturing costs associated with fabricating and assembling customized lids **104** for disposable, insulated containers.

FIG. **5** is a top view of an alternative embodiment of a base **206** with cover **108** removed, and FIG. **6** is a cross-sectional view of lid **104** having base **206** (rather than base **106**) and taken along line **6-6** with cover **108** present. Base **206** is generally circular and includes an upper surface **208**, an annular lip **210** projecting from upper surface **208**, an outer array **212** of spacer members projecting from upper surface **208**, an inner array **214** of spacer members projecting from upper surface **208**, and a central hub **216** projecting from upper surface **208**. More specifically, lip **210** projects upwardly from upper surface **208** about an outer perimeter of base **206** to define an inner area **217**. Lip **210** has an inner surface **218**, an outer surface **220**, an annular indentation **222** formed on outer surface **220**, an annular rib **224** defining inner surface **218**, and an annular retainer rib **226** projecting upward from annular rib **224**. In this embodiment, outer array **212** includes a plurality of radial ribs **228** that are at least partially integrally formed with and extend radially inwardly from lip **210**, and radial ribs **228** are circumferentially spaced apart from one another about lip **210** and/or annular support rib **224**. In one embodiment, outer array **212** includes sixteen radial ribs **228**. In other embodiments, outer array **212** may have any suitable number of radial ribs **228**.

Inner array **214** includes a plurality of radial ribs **230** that are circumferentially spaced apart from one another about central hub **216**. Ribs **224**, **228**, and/or **230** may or may not include support ribs. Each radial rib **230** of inner array **214** is substantially co-radially aligned with one radial rib **228** of outer array **212** such that every other radial rib **228** has a corresponding radial rib **230**. In this embodiment, each radial rib **230** is longer than, and spaced apart from, its corresponding radial rib **228**. In other embodiments, inner array **214** may include any suitable number of ribs **230** and/or spacer members aligned in any suitable manner and having any suitable length relative to ribs **228** of outer array **212**. In this embodiment, radial ribs **230** extend from and are at least partially integrally formed with central hub **216**. Radial ribs **230** of inner array **214**, radial ribs **228** of outer array **212**, and annular rib **224** are substantially the same height above upper surface **208**. While inner array **214** includes eight radial ribs **230** in this embodiment, inner array **214** may have any suitable number of radial ribs **230** in other embodiments. In alternative embodiments, base **206** may include any suitable number of ribs **228**, **230**, and/or **224** having any suitable contours and/or orientations (e.g., radial ribs **228** and/or **230** may be curvilinearly oriented rather than radially oriented).

Central hub **216** has a vent, such as a vent flap and/or a vent hole **232**, formed in a central region thereof, and vent hole **232** extends through base **206** to facilitate ventilating (e.g., releas-

ing steam from) container system **100** when lid **104** is coupled to container, as described above. In other embodiments, central hub **216** may include any suitable number of vent holes **232** and/or other suitable vents arranged in any suitable manner. Alternatively, vent hole(s) **232** may be located on any suitable region of base **206** (e.g., vent holes **232** may not be formed in central hub **216**). In the exemplary embodiment, central hub **216** does not project to the height of radial ribs **230** of inner array **214** such that central hub **216** is recessed relative to radial ribs **230** of inner array **214**.

In the assembled configuration of lid **104** using base **206**, cover **108** is fastened to base **206** above ribs **228** and/or **230** with peripheral portion **146** of cover **108** fastened and/or couple to annular support rib **224** within retainer rib **226** (e.g., via an adhesive). When peripheral portion **146** of cover **108** is fastened and/or coupled to annular support rib **224**, remaining segments of cover **108** (e.g., central segments of cover **108**) are seated on and/or positioned above ribs **228** and/or **230** such that cover **108** is supported and/or maintained in a spaced apart relationship relative to upper surface **208**, thereby defining an air pocket **234** between cover **108** and upper surface **208** within lip **210** to facilitate insulating container system **100** and maintaining a temperature of the product within container system **100**. Like base **106**, air is permitted to flow through the spaces between radial ribs **230** of base **206** and into the area above recessed central hub **216**, and air can flow between air pocket **234** and sealed container system **100** via vent hole **232** (e.g., steam can be released from container system **100** through vent hole **232** of base **206** and can exit air pocket **234** through vent holes **114** of cover **108**).

FIG. **7** is an exploded perspective view of a second alternative lid **300** that may be used with container **102** (shown in FIG. **1**). FIG. **8** is a top view of lid **300** with a cover removed. FIG. **9** is a cross-sectional view of lid **300** taken at line **9-9** of FIG. **8** with the addition of the cover. FIG. **10** is a cross-sectional view of lid **300** taken at line **10-10** of FIG. **8** with the addition of the cover. In FIGS. **9** and **10**, additional radial ribs are excluded for clarity.

Lid **300** has a base **302** and a cover **304** coupled to base **302**. Cover **304** can be similar to cover **108** (shown in FIG. **2**), described in more detail above. Base **302** includes an annular lip **306** configured to receive upper rim **112** (shown in FIG. **1**) of container **102** for detachably coupling lid **300** to container **102** to substantially seal container system **100** (shown in FIG. **1**). Cover **304** is coupled to base **302** such that lip **306** circumscribes cover **304**. In the exemplary embodiment, lid **300** is generally circular in shape, but lid **300** may be any suitable shape in other embodiments. In the exemplary embodiment, base **302** is integrally formed from a synthetic or semi-synthetic, organic-based material (e.g., a "plastic" material) using a molding process, and cover **304** is fabricated from a paper material. It is understood, however, that base **302** and/or cover **304** may be fabricated from any suitable materials using any suitable manufacturing processes.

Base **302** includes an upper surface **308**, lip **306** projecting upwardly from upper surface **308**, an outer array **310** of spacer members projecting from upper surface **308**, and an inner array **312** of spacer members projecting from upper surface **308**. More specifically, lip **306** projects upwardly from upper surface **308** about an outer perimeter of base **302** to define an inner area **313**. Lip **306** has an inner surface **314**, an outer surface **316**, an upper side **318**, and a bottom side **320**. Bottom side **320** is configured to receive upper rim **112** of container **102**. In the exemplary embodiment, a plurality of circumferentially spaced indentations **322** are formed in outer surface **316**, and a retaining groove **324** is formed in inner surface **314**. Retaining groove **324** is below upper side **318** and spaced apart from upper surface **308**. Retaining groove **324** includes a top surface **326** and a bottom surface **328**. In other embodiments, retaining groove **324** may have any suitable shape and location relative to upper surface **308** and/or upper side **318**.

In the exemplary embodiment, outer array **310** includes an annular rib **330** and a plurality of radial ribs **332** that extend radially inwardly from annular rib **330**. Annular rib **330** extends radially inwardly from lip **306** and is adjacent to lip **306**. Annular rib **330** extends into groove **324**. Radial ribs **332** are circumferentially spaced apart from one another about annular rib **330** and each extend from annular rib **330** toward a center **334** of base **302**. In one embodiment, outer array **310** includes ten radial ribs **332**. In other embodiments, outer array **310** may have any suitable number of radial ribs **332**.

In the exemplary embodiment, inner array **312** includes a plurality of radial ribs **336** that are circumferentially spaced apart from one another and extend radially with respect to center **334**. Ribs **330**, **332**, and/or **336** may or may not be support ribs. Radial ribs **336** are spaced a distance from center **334**. Each radial rib **336** of inner array **312** is positioned between adjacent radial ribs **332** of outer array **310**. In other embodiments, inner array **312** may include any suitable number of ribs **336** aligned in any suitable manner and having any suitable length relative to outer radial ribs **332**. In the exemplary embodiment, each radial rib **336** is wider than each outer radial rib **332**. Further, each inner radial rib **336** is spaced apart from adjacent outer radial ribs **332** and annular rib **330**. As such, each inner radial rib **336** is in not in contact with any other rib **336**, **332**, and/or **330**.

Ribs **336** of inner array **312** and ribs **330** and **332** of outer array **310** project to substantially the same height above upper surface **308** as bottom surface **328** retaining groove **324**. As such ribs **330**, **332**, and **336** have a height that is below top surface **326** of retaining groove **324**. In alternative embodiments, base **302** may include any number of ribs **330**, **332**, and/or **336** having any suitable contours and/or orientations (e.g., ribs **332** and/or **336** may be curvilinearly oriented and may not be radially oriented).

In the exemplary embodiment, a recess or reservoir **338** is defined about center **334** of base **302** by radial ribs **332** and/or **336**. A vent, such as a vent flap and/or a vent hole **340**, is defined at or near center **334** and extends through base **302** to facilitate ventilating (e.g., releasing steam from) and/or draining (e.g., channeling liquid into) container system **100** when lid **300** is coupled to container **102**. In other embodiments, base **302** may include any suitable number and/or type of vents arranged in any suitable manner. Alternatively, vent hole(s) **340** may be located on any suitable segment of base **302** (e.g., vent holes **340** may not be formed in reservoir **338**). In the exemplary embodiment, holes **342** defined in cover **304** do not align with vent hole **340** to facilitate preventing spillage from container **102** through vent hole **340** and a cover hole **342**. Further, reservoir **338** is configured to capture any liquid or condensed steam that has passed through vent hole **340**. More specifically, upper surface **308** of base **302** is contoured to direct liquid and/or condensate toward center **334** and/or reservoir **338**. For example, upper surface **308** is slightly sloped from lip **306** downward toward center **334**. Vent hole **340** is configured to channel the liquid and/or the condensate from reservoir **338** back into container **102**.

In the assembled configuration of lid **300**, cover **304** is fastened to base **302** above ribs **330**, **332**, and/or **336** with a peripheral portion, including an outer edge **344**, of cover **304** received within retaining groove **324** of lip **306**. In some embodiments, cover **304** may be fastened to top surface **326** or bottom surface **328** of retaining groove **324** (e.g., via an

adhesive or any other suitable fastener). In other embodiments, cover **304** may not be fastened to retaining groove **324** (e.g., the cover may be detachable from base **302** by simply removing the peripheral portion of cover **304** from retaining groove **324**). When the peripheral portion of cover **304** is inserted into retaining groove **324**, remaining segments of cover **304** (e.g., central segments of cover **304**) are seated on and/or positioned above ribs **330**, **332**, and/or **336** such that cover **304** is supported and/or maintained in a spaced apart relationship relative to upper surface **308**, thereby defining an air pocket **346** between cover **304** and upper surface **308** within annular support rib **330** to facilitate insulating container system **100** and maintaining a temperature of the product within container system **100**. When ribs **330**, **332**, and/or **336** are support ribs, ribs **330**, **332**, and/or **336** apply an upward force on cover **304** while top surface **326** applies a downward force for securing cover **304** to base **302**.

Because air is permitted to flow through the spaces between radial ribs **336** of inner array **312** and into the area above reservoir **338**, air can flow between the air pocket and sealed container system **100** (e.g., steam can be released from container system **100** into air pocket **346** through vent hole **340** of base **302**, thereafter exiting air pocket **346** through vent holes **342** of cover **304**). Because base **302** can be fabricated from a thin layer of plastic and cover **304** can be fabricated from a thin layer of paper material, and because air is used to facilitate insulating lid **300**, lid **300** may be fabricated in a less expensive manner, thereby rendering lid **300** more suitable for disposable (e.g., point-of-sale or one-time-use) applications. Alternatively, lid **300** may be fabricated from materials and using processes that render lid **300** more suitable for repeated use applications in other embodiments. Also, because cover **304** can be fabricated from a paper material, cover **304** may include marketing indicia (e.g., logos and/or slogans) printed on cover **304** to suit a particular vendor. Cover **304** is also configured for easy fastening to base **302**, thereby enabling a single configuration of base **302** to be used with various, customized covers to decrease manufacturing costs associated with fabricating and assembling customized lids **300** for disposable, insulated containers.

FIG. **11** is a partial cross-sectional view of two of lids **300***a* and **300***b* in a stack taken at a cross-section similar to line **9-9** shown in FIG. **8**. More specifically, lid **300** is configured to nest with other lids **300** to form the stack. Further, lid **300** includes stacking features that allow lids **300** to be easily removed from the stack. Referring to FIGS. **9-11**, lid **300** includes an annular ridge **348** extending inwardly from inner surface **314** of lip **306**. A bottom surface of annular ridge **348** defines top surface **326** of groove **324**. At least one lug **350** extends upwardly from ridge **348** and inwardly from lip inner surface **314**. In the exemplary embodiment, a plurality of lugs **350** are circumferentially spaced about inner surface **314** and extend upward from ridge **348**. Lugs **350** are configured to facilitate nesting and de-nesting of lids **300** when lids **300** are stacked and unstacked, respectively.

Referring to FIG. **11**, each lug **350** includes a top surface **352**. In the exemplary embodiment, lug **350** is substantially rectangular-shaped; however, lug **350** can have any suitable shape that enables lug **350** to function as described herein. Top surface **352** of lug **350** is configured to support an upper lid **300***a* when lids **300***a* and **300***b* are stacked. More specifically, lip **306** of lower lid **300***b* is inserted into a space **354** defined by lip **306** of upper lid **300***a* to nest lids **300***a* and **300***b*. A bottom surface **356** of upper lid **300***a* contacts top surface **352** of lugs **350** of lower lid **300***b* when lids **300***a* and **300***b* are nested. Indentation **322** of upper lid **300***a* can rest on upper side **318** of lip **306** of lower lid **300***b*.

FIG. **12** is a top view of a third alternative lid **400** that may be used with container **102** (shown in FIG. **1**). A base **402** is shown in FIG. **12**, but the cover is not shown in FIG. **12**. Base **402** is substantially similar to base **303** (shown in FIGS. **7-11**), except base **402** includes dimples as spacer members. More specifically, base **402** includes a plurality of dimples **404**, rather than solid portions of raised material that define ribs **330**, **332**, and **336** (all shown in FIGS. **7** and **8**). As such, base **402** includes reservoir **338**, as described in more detail above. Further, it should be understood that base **106** (shown in FIGS. **3** and **4**) and/or base **206** (shown in FIGS. **5** and **6**) can include dimples and/or any other suitable spacer member, rather than solid portions of raised material forming ribs as shown in FIGS. **3-6**.

The methods and systems described herein therefore facilitate providing a lid with an air pocket for insulating a container and maintaining a temperature of a product within the container. The methods and systems described herein also facilitate providing a lid that enables steam from a heated food product to be released from the container and channeled by the lid to an air pocket positioned between the base and the cover. The heated air pocket creates an insulated air barrier between the base and the cover resulting an improved insulated lid. The methods and systems described herein further facilitate providing a base that may be fabricated from a thin layer of plastic, a cover that may be fabricated from a thin layer of paper material, and a lid that may be insulated using air heated by the product contained in the container, thereby enabling the lid to be fabricated in a less expensive manner and rendering the lid more suitable for disposable (e.g., point-of-sale or one-time-use) applications. Additionally, the methods and systems described herein facilitate providing a lid having a base that may be easily assembled with various, customized covers, thereby decreasing a manufacturing cost associated with fabricating customized lids for disposable, insulated containers. The lid may also be used with a reusable container.

In one aspect, an insulating lid for a container is provided. The lid includes a cover having an outer edge. The lid also includes a base having an upper surface, a lip projecting upwardly from the upper surface and extending around an outer perimeter of the base to define an inner area, and a set of support ribs extending upwardly from the upper surface positioned within the inner area. The lip includes a retaining groove configured to receive the outer edge of the cover and secure the cover to the base. The set of support ribs are configured to space the cover from the upper surface for creating an insulating space between the cover and the upper surface of the base. In one embodiment, the base includes at least one vent hole for channeling air from within the container to the insulating space, wherein the channeled air is at least one of above and below ambient temperature.

In another aspect, a method for assembling an insulating lid for a container is provided. The method includes providing a base having an upper surface, a lip projecting upwardly from the upper surface and extending around an outer perimeter of the base to define an inner area, and a set of support ribs extending upwardly from the upper surface positioned within the inner area. The lip includes a retaining groove. The method also includes providing a cover having an outer edge and coupling the cover to the base, wherein the outer edge of the cover is received within the retaining groove to secure the cover to the base and wherein the set of support ribs space the cover from the upper surface creating an insulating space between the cover and the upper surface of the base.

Exemplary embodiments of a container lid are described above in detail. The container lid described herein is not

limited to the specific embodiments described herein, but rather, components of the lid may be utilized independently and separately from one another. For example, the lid described herein may have other applications not limited to disposable food and beverage containers, as described herein. Rather, the lid described herein can be implemented and utilized in connection with various other industries. Moreover, the container system described above is described as containing a product that has been heated above ambient temperature such that the insulated lid helps maintain the product at the heated temperature. Alternatively, the container system could be used for storing a product that has been cooled below ambient temperature or even frozen such that the insulated lid would help maintain the product at the cooled temperature.

This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

What is claimed is:

1. An insulating lid for a container comprising:

a cover comprising an outer edge; and

a base comprising:

an upper surface;

a lip projecting upwardly from the upper surface about an outer perimeter of the base to define an inner area; and

a plurality of spacer members extending upwardly from the upper surface positioned within the inner area, the plurality of spacer members configured to space the cover a distance from the upper surface of the base to define an insulating space between the cover and the upper surface of the base, wherein the plurality of spacer members comprise:

an annular rib;

an array of outer radial ribs extending from the annular rib; and

an array of inner radial ribs positioned inwardly with respect to the outer radial ribs.

2. An insulating lid in accordance with claim **1**, wherein the base comprises at least one vent configured to channel air from within the container to the insulating space.

3. An insulating lid in accordance with claim **1**, wherein the lip further comprises a retaining groove configured to receive the outer edge of the cover to secure the cover to the base.

4. An insulating lid in accordance with claim **1**, wherein the base further comprises a central hub, the inner radial ribs extending outwardly from the central hub toward the annular rib.

5. An insulating lid in accordance with claim **1**, wherein the base further comprises a reservoir defined about a center of the base, the inner radial ribs spaced a distance from the center of the base.

6. An insulating lid in accordance with claim **1**, wherein at least one of the annular rib, the outer radial ribs, and the inner radial ribs comprises at least one support rib.

7. An insulating lid in accordance with claim **1**, wherein the base further comprises an annular retainer rib projecting upwardly from the annular rib, the annular retainer rib configured to substantially circumscribe the outer edge of the cover when the cover is coupled to a top surface of the annular rib.

8. An insulating lid in accordance with claim **1**, wherein the insulating lid is a first insulating lid, and wherein the base further comprises:

an annular ridge defined about an inner surface of the lip and extending inwardly from the inner surface;

at least one lug extending inwardly from the inner surface of the lip and upwardly from the annular ridge, the at least one lug configured to contact a bottom surface of a second insulating lid when the second insulating lid is stacked on top of the first insulating lid.

9. A base for use with an insulating lid for use with a container, the base comprising:

an upper surface;

a lip projecting upwardly from the upper surface about an outer perimeter of the base to define an inner area; and

a plurality of spacer members extending upwardly from the upper surface positioned within the inner area, the plurality of spacer members configured to space a cover a distance from the upper surface of the base to define an insulating space between the cover and the upper surface of the base, wherein the plurality of spacer members comprise:

an annular rib;

an array of outer radial ribs extending from the annular rib; and

an array of inner radial ribs positioned inwardly with respect to the outer radial ribs.

10. A base in accordance with claim **9**, wherein the lip further comprises a retaining groove configured to receive the outer edge of the cover to secure the cover to the base.

11. A base in accordance with claim **9** further comprising a central hub and a vent defined through the central hub, the vent configured to channel at least air from within the container to the insulating space, wherein the inner radial ribs extend outwardly from the central hub toward the annular rib.

12. A base in accordance with claim **9**, wherein the base further comprises a reservoir defined about a center of the base and a vent defined through the reservoir, the vent configured to channel at least one of air and liquid between the container and the insulating space, wherein the inner radial ribs are spaced a distance from the center of the base.

13. A base in accordance with claim **9** further comprising an annular retainer rib projecting upwardly from the annular rib, the annular retainer rib configured to substantially circumscribe the outer edge of the cover when the cover is coupled to a top surface of the annular rib.

14. A base in accordance with claim **9**, wherein the insulating lid is a first insulating lid, the base further comprising:

an annular ridge defined about an inner surface of the lip and extending inwardly from the inner surface, the annular ridge partially defining a retaining groove configured to receive the outer edge of the cover to secure the cover to the base;

at least one lug extending inwardly from the inner surface of the lip and upwardly from the annular ridge, the at least one lug configured to contact a bottom surface of a second insulating lid when the second insulating lid is stacked on top of the first insulating lid.

15. A method for assembling an insulating lid for a container, the lid including a cover and a base, the base including an upper surface, a lip projecting upwardly from the upper surface and extending around an outer perimeter of the base to define an inner area, and a plurality of spacer members

extending upwardly from the upper surface positioned within the inner area, the method comprising:

positioning the cover over the plurality of spacer members of the base to define an insulating space between the cover and the upper surface of the base, wherein the plurality of spacer members include an annular rib, an array of outer radial ribs extending from the annular rib, and an array of inner radial ribs positioned inwardly with respect to the outer radial ribs; and

coupling the cover to the base to form the lid.

16. A method in accordance with claim **15**, wherein the lip of the base includes a retaining groove, coupling the cover to the base further comprising inserting the outer edge of the cover into the retaining groove to secure the cover to the base.

17. A method in accordance with claim **15**, wherein the base further includes an annular retainer rib projecting upwardly from the annular rib, and coupling the cover to the base further comprises:

inserting the cover within the annular retainer rib, the annular retainer rib substantially circumscribing the outer edge of the cover; and

coupling the cover to a top surface of the annular rib.

* * * * *